



University Name: Al-Muthanna University

Faculty/Institute: Sciences

Scientific Department: Biology

Academic or Professional Program Name: M.Sc. degree in science

Final Certificate Name: M.Sc. Biology Sciences

Academic System: Semester (courses)

Description Preparation Date: October 2025

File Completion Date: 2026/2/23


Signature:

Head of Department Name:

Bassim Abdullah Jassim

Date: 23/2/2026


Signature:

Assistant Dean for Scientific Affairs

Graduate Studies

Salah A. Hassan

Date: 23/2/2026

The file is checked by:

Department of Quality Assurance and University Performance

Date: 23/2/2026

Signature:


تأهبة ضمان الجودة
وتقويم الأداء



Approval of the Dean

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department



Academic Program and Course Description Guide

2025/2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are

followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

1. Program Vision

Spreading awareness and knowledge in the fields of life sciences by providing the country with researchers and professors capable of dealing with the latest developments and advancements in the world and contributing to our scientific, health, industrial, environmental and ecological development in solving the problems that are still available.

2. Program Mission

Contributing to keeping pace with the rapid scientific developments and breakthroughs taking place in our time by developing our educational and research outputs in accordance with global and regional standards and contributing effectively to putting clear scientific touches in society.

3. Program Objectives

1. To study biological sciences comprehensively, including their theoretical, scientific, and applied applications in society.
2. To prepare specialized scientific personnel in the medical, health, agricultural, food processing, and biological fields.
3. To equip students with the scientific techniques for using equipment and instruments applicable to their theoretical and applied studies.
4. To provide students with academic and practical knowledge of biological sciences across their various disciplines and specializations.
5. To supply government institutions and the mixed and private sectors (medical, industrial, and laboratory institutions) with specialized personnel.
6. To research and study new developments in biological sciences, keep abreast of scientific advancements in this field, and integrate them into the curriculum.

7. To provide the job market with numerous graduates who work in various government institutions, such as health, education, environment, electricity, and oil, thus enriching government departments with specialized staff.

8- Pumping the highest competencies from the sons of the governorate into the state departments to contribute to the development of their work, through the introduction of postgraduate studies, doctorate, in addition to master's studies, which helped to increase the workforce in our university by appointing holders of higher degrees in accordance with the labor market.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program? Ministry of Higher Education and Scientific Research / Al-Muthanna University / College of Science.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Department Requirements / Biology	2	13	36%	

* This can include notes whether the course is basic or optional.

7. Program Description			8. Expected learning outcomes of the program
الساعات المعتمدة	Course Code	Year/Level	
practical			
2	Molecular Biology	M.Sc. first semester	
2	Advanced Plant Physiology	M.Sc. first semester	
2	Advanced Microbiology	M.Sc. first semester	
2	Advanced Cytology	M.Sc. first semester	
2	Advanced Biochemistry	M.Sc. first semester	
2	Advanced Biostatic	M.Sc. first semester	
1	Advanced English	M.Sc. first semester	
2	Advanced Physiology	M.Sc. Second semester	
2	Adv. Ecology	M.Sc. Second semester	
2	Advanced Biotechnology	M.Sc. Second semester	
2	Pathogenic Bacteria	M.Sc. Second semester	
2	Advanced Mycology	M.Sc. Second semester	
2	Research Methodology	M.Sc. Second semester	
1	Advanced English	M.Sc. Second semester	
			Knowledge
			1. Research & Technical Skills: Independently formulate hypotheses, design experiments, and use advanced

<p>laboratory o</p> <ol style="list-style-type: none"> 2. Critical Think data sets, an 3. Communica findings to p 4. Expertise: D molecular bi 5. Scientific Im data manag
Skills
Program Skill Ob
<ol style="list-style-type: none"> 6. Research & research, inc 7. Analytical & appropriate 8. Scientific Co professional 9. Critical Think literature, un 10. Professional demonstrati <p>biological re</p>
Ethics
<ol style="list-style-type: none"> 1. Mastery of E standards f 2. Scientific Im guidelines i 3. Ethical Eval and ethical 4. Regulatory C regulatory f 5. Professional ethical app 6. Communica based on et

9. Teaching and Learning Strategies

1) Deep understanding and critical thinking

- **Active reading:** Before lectures, skim papers or chapters to identify hypotheses, methods, results, and conclusions. Ask questions like: What was the main question? What methods were used? Do the data support the conclusions?
- **Assimilate, don't memorize:** Focus on understanding mechanisms, pathways, and experimental logic. Create concept maps linking ideas (e.g., signaling pathways, metabolic networks).
- **Ask "why" and "how":** For every result, explain the rationale of the experiment and predict what would happen if a variable changes.

2) Experimental design and data analysis

- **Learn the workflow:** Formulate a biological question → design a hypothesis-driven experiment → determine controls and variables → plan data collection → outline analysis and interpretation.
- **Statistics literacy:** Ensure comfort with common tests (t-tests, ANOVA, chi-square), confidence intervals, p-values vs. effect sizes, and basic bioinformatics approaches (e.g., differential expression analysis).
- **Reproducibility:** Practice writing methods sections (even for personal notes) so experiments can be replicated.

3) Literature mastery

- **Paper triage:** Learn to quickly assess a paper's significance, novelty, and methodological soundness.
- **Critical appraisal checklist:** Sample size adequacy, controls, potential biases, alternative explanations, and limitations.
- **Summarize succinctly:** Write a 1-page synthesis that includes the question, approach, key results, and implications.

4) Laboratory and field skills

- **Hands-on practice:** Prioritize mastering core techniques relevant to your field (e.g., molecular biology workflows, imaging, chromatography, computational pipelines).
- **Protocol optimization:** When a protocol fails, document variables, troubleshoot systematically, and iterate.
- **Safety and ethics:** Stay current with safety regulations and ethical considerations for animal/human-derived samples, environmental impacts, and data privacy.

5) Data literacy and computation

- **Programming fundamentals:** Python or R for data analysis; version control with Git.
- **Bioinformatics pipelines:** Learn how to process sequencing data, align reads, perform quality control, and interpret results.

- **Visualization:** Create clear, informative figures that tell a story (think about axes, scales, legends, and statistical annotations).

6) Time management and productivity

- **Structured study blocks:** Use focused sessions (e.g., 25–50 minutes) with short breaks; apply the two-pass approach for literature review.
- **Prioritize tasks:** Use a dashboard (projects, experiments, papers) and weekly goals.
- **Mindful reflection:** Regularly review what you learned, what remains unclear, and adjust plans accordingly.

7) Communication and presentation

- **Storytelling in science:** Build a narrative from question to method to result to implication.
- **Improved writing:** Practice concise, precise writing; maintain a consistent structure (Introduction, Methods, Results, Discussion).
- **Presentations:** Tailor depth to the audience; practice with a time limit; anticipate questions and prepare concise answers.

8) Collaboration and mentorship

- **Peer learning:** Form study groups to discuss papers, critique experiments, and share code/scripts.
- **Seek mentorship:** Regular meetings with supervisors to align on milestones and receive feedback.
- **Ethical collaboration:** Define roles, credit contributions, and manage data sharing transparently.

10. Evaluation methods

1) Examinations

- **Formats:** Midterm/final written exams, open-book vs. closed-book, data interpretation, case-based questions.
- **What they assess:** Core knowledge, problem-solving, data literacy, and the ability to apply concepts to new scenarios.
- **Strengths:** Standardized, scalable; good for comparing across cohorts.
- **Pitfalls:** May underrepresent experimental design, collaboration, or reproducibility skills; stress impact.

2) Coursework assignments

- **Formats:** Problem sets, data analyses/replication of analyses, literature reviews, critical essays, protocol design exercises.
- **What they assess:** Technical proficiency, analytical thinking, synthesis of literature, and planning abilities.
- **Strengths:** Encourages practical skills and reproducible thinking.
- **Pitfalls:** Grading consistency; rubric clarity is essential.

3) Presentations and scientific communication

- **Formats:** Oral talks, poster sessions, grant pitches, written reports/manuscripts.
- **What they assess:** Data storytelling, clarity, audience adaptation, and Q&A performance.
- **Strengths:** Key professional skill; observable through performance.
- **Pitfalls:** Q&A can be subjective; require clear rubrics and practice time.

4) Journal clubs and seminars

- **Formats:** Critical appraisal of papers; lead discussions; brief write-ups.
- **What they assess:** Critical thinking, evaluation of methods/statistics, and ability to communicate critique.
- **Strengths:** Fosters a culture of rigorous analysis.
- **Pitfalls:** Uneven participation; ensure rotation and clear expectations.

5) Biostatistics and data analysis assessment

- **Formats:** Short tests, hands-on data tasks, interpretation questions, or take-home analyses.
- **What they assess:** Statistical reasoning, proper method selection, interpretation of results, and awareness of assumptions.
- **Strengths:** Directly relevant to research integrity and conclusions.
- **Pitfalls:** Requires foundational training; consider offering formula sheets or calculators.

Professional Development

Mentoring new faculty members

Briefly describe the process used to orient new, visiting, full-time, and part-time faculty members at the institutional and departmental levels. **Workshops and Training Courses:** Courses are organized on modern teaching methods, classroom management, and the use of educational technologies. **Participation in Academic Seminars:** New faculty members are encouraged to attend conferences and seminars to expand their knowledge and build academic networks.

Evaluation and Feedback: Regularly provide constructive feedback to improve academic performance. **Promoting Academic Research and Publication:** Supporting new faculty members in preparing and publishing their research and participating in research teams within the department or college. **Participation in Committees:** New faculty members are provided the opportunity to participate in departmental committees to enhance their understanding of administrative and academic systems.

Professional development of faculty members

Personal development is planned through reviewing modern scientific resources and participating in training courses both inside and outside the country in the field of scientific specialization. The Scientific Department pays special attention to the continuous professional development of faculty members, with the aim of enhancing their teaching and research competencies and keeping pace with academic developments. This includes:

- Organizing advanced workshops and training courses in teaching methods, student assessment, and the use of modern educational technology.
- Encouraging scientific research and academic publishing by supporting participation in conferences, scientific journals, and joint research projects.
- Participating in quality and academic accreditation programs to raise awareness of educational standards and develop institutional performance.
- Academic exchange and cooperation with other universities, both internally and externally, to exchange experiences and expand horizons of knowledge.
- Contributing to the development of curricula and courses to keep pace with scientific developments and labor market needs.
- Self-evaluation and continuous feedback to identify strengths and opportunities for improvement in academic performance.
- Encouraging the use of innovative teaching methods such as active learning and project-based learning.

2. Acceptance Criterion

Central: The program follows the central admission regulations set by the ministry

3. The most important sources of information about the program

- 1- Student Guide for Admission issued by the Ministry of Higher Education and Scientific Research.
- 2- • Student Guide issued by the College of Science, Al-Muthanna University (Quality Assurance Division)
- 3- • Student Guide issued by the Department of Biology.

4. Program Development Plan

- 1- The plan aims to improve the quality of teaching and learning and update programs to keep pace with scientific developments and the labor market. This can be achieved through:
- 2- • Periodically reviewing and updating curricula to ensure they are aligned with modern academic standards.

- 3- • Aligning learning outcomes with labor market requirements and focusing on practical aspects through the recommendations of the annual employers' conference.
- 4- • Enhancing practical and applied training within and outside the college in cooperation with labor market institutions.
- 5- • Introducing modern courses related to sustainable development, such as green chemistry, to support scientific research, critical thinking, and analytical skills.
- 6- • Using modern educational technologies, activating e-learning and interactive courses, and achieving a 20% completion rate for digital courses.
- 7- • Through graduation projects and scientific activities, selecting ideas and projects to solve societal problems.
- 8- • Developing the research and scientific capabilities of faculty members through specialized training workshops.

Program Skills Plan													
Learning outcomes required from the program											Course Name	Year/Level	
Values			Skills			Knowledge							
2ق	1ق	4م	3م	2م	1م	5ع	4ع	3ع	2ع	1ع			
#			#		#			#		#		Molecular Biology	M.Sc. first semester
#	#	#	#	#		#	#		#			Advanced Plant Physiology	M.Sc. first semester
#			#		#			#		#		Advanced Microbiology	M.Sc. first semester
#	#	#	#	#		#	#		#			Advanced Cytology	M.Sc. first semester
#	#	#	#	#		#	#		#			Advanced Biochemistry	M.Sc. first semester
#			#		#			#		#		Advanced Biostatic	M.Sc. first semester
#			#		#			#		#		Advanced English	M.Sc. first semester
#	#	#	#	#		#	#		#			Advanced Physiology	M.Sc. Second semester
#			#		#			#		#		Adv. Ecology	M.Sc. Second semester
#	#	#	#	#		#	#		#			Advanced Biotechnology	M.Sc. Second semester
#			#		#			#		#		Pathogenic Bacteria	M.Sc. Second semester
#	#	#	#	#		#	#		#			Advanced Mycology	M.Sc. Second semester
#			#		#			#		#		Research Methodology	M.Sc. Second semester
#	#	#	#	#		#	#		#			Advanced English	M.Sc. Second semester

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.



Course Description Form

1. Course Name: Adv. Microbiology

2. Course Code :

3. Semester (1)/ Year 2025-2026

4. Description Preparation Date: 15/2/2026

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total) / 30 Hours

7. Course administrator's name (mention all, if more than one name)

8. Course Objectives : The objective of the Microbiology course is to provide students with a comprehensive understanding of microorganisms, including bacteria, viruses, fungi, and parasites, and their roles in health, disease, and the environment

9. Teaching and Learning Strategies : This course provides an introduction to the study of microorganisms, including bacteria, viruses, fungi, and parasites, and their impact on human health, disease, and the environment. Students will explore microbial structure, physiology, genetics, metabolism, and classification. The course emphasizes the mechanisms of microbial pathogenesis, host-microbe interactions, and the body's immune response.

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	General Aspects of Medical Microbiology Pathogens. Subcellular Infectious Entities , Prokaryotic and Eukaryotic Microorganisms, Bacteria, Fungi and Protozoa, Animals. Host-Pathogen Interactions:		2	1



		Determinants of Bacterial Pathogenicity and Virulence. Adhesion, Invasion and Spread, Strategies against Nonspecific Immunity , Strategies against Specific Immunity, Clinical Disease, Regulation of Bacterial Virulence, The Genetics of Bacterial Pathogenicity.			
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Defenses against Infection: Nonspecific Defense Mechanisms, Specific Defense Mechanisms, Defects in Immune Defenses. Normal Flora General Epidemiology: Epidemiological Terminology, Transmission, Sources of Infection, Transmission, Sources of Infection,		2	2
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	General Bacteriology: The Morphology and Fine Structure of Bacteria. The Physiology of Metabolism and Growth in Bacteria: Bacterial Metabolism, Types of Metabolism, Catabolic Reactions, Anabolic Reactions, Metabolic Regulation,		2	3
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Growth and Culturing of Bacteria: Nutrients , Growth and Cell Death. Bacteriophages : Definition, Morphology, Composition, Reproduction, Lysogeny. The Principles of Antibiotic Therapy: Definitions, Spectrum of Action, Efficacy, Mechanisms of Action, Pharmacokinetics, Side Effects. The Problem of Resistance: Definitions, Incidence, Significance, Resistance Mechanisms, Evolution of Resistance to Anti-Infective Agents, Resistance Tests, Combination Therapy		2	4
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	General Mycology: General Characteristics of Fungi: Definition and Taxonomy, Morphology, Metabolism, Reproduction in Fungi. General Aspects of Fungal Disease: Fungal Allergies and Fungal Toxicoses , Mycogenic		2	5



		Allergies, Mycotoxicoses.			
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Mycoses: Host-Pathogen Interactions Diagnosis, Therapy.		2	6
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	General Virology: Definition , Morphology and Structure, Classification, Replication, Viral Protein Synthesis, Genetics.		2	7
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Host-Cell Reactions: Cell Destruction (Cytocidal Infection ,Necrosis), Non cytotoxic Infection, Latent Infection, Tumor Transformation. Pathogenesis Defense Mechanisms Prevention Chemotherapy		2	8
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Basic Principles of Immunology: The Immunological Apparatus : The B-Cell System : Immunoglobulin Structure , Immunoglobulins, The Different Classes of Immunoglobulins. The T-Cell System : T-Cell Receptors (TCR) and Accessory Molecules T-Cell Specificity and the Major Histocompatibility Complex (MHC) T-Cell Maturation: Positive and Negative Selection T-Cell Subpopulations		2	9
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Immune Responses and Effector Mechanisms : B Cells B-Cell Epitopes and B-Cell Proliferation Monoclonal Antibodies, T-Independent B Cell Responses. T Cells T-Cell Activation, T-Cell Activation by Superantigens,			10
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Interactions between Cells of the Immune System: Collaboration, Sub populations of T- Helper Cells, Cytotoxic T-Cells (CD8+T-Cells), Cytokines (Interleukins) and Adhesion, Antibody-Dependent Cellular Immunity and Natural Killer Cells, Mechanisms. The Complement System		2	11



Immunological Cell Death					
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Immunological Tolerance : T-Cell Tolerance B-Cell Tolerance Immunological Memory: B-Cell Memory T-Cell Memory		2	12
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Immune Defenses against Infection and Tumor Immunity: General Rules Applying to Infection Defenses Immune Protection and Immunopathology Tumor Immunity		2	13
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	The Pathological Immune Response: Type I: IgE- Triggered Anaphylaxis Type II: Cytotoxic Humoral Immune Responses Type III: Diseases Caused by Immune Complexes Type IV: Cell-mediated Immunopathology Transplantation Immunity		2	14
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	Immune Defects and Immune Response Modulation: Immune Defects Immuno regulation Immuno stimulation Immuno suppression Adaptive Immunotherapy		2	15

11. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

12. Learning and Teaching Resources

Required textbooks

- Review of medical microbiology . Jawetz.
- Lange Medical Microbiology, 24th Edition:



Main references (sources)

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Jawetz, Melnick, & Adelberg; McGraw-Hill Medical 2007.

- Jawetz, Melnick, & Adelberg's Medical Microbiology twenty-fourth edition Geo. F. Brooks, et al.
- Medical Microbiology and Infection at a Glance Stephen H. et al.

Head of Dep.
Prof. Dr. Bassim.A.Jassim

Lecturer
Prof. Maitham A. Makei



Course Description Form

1. Course Name: Pathogenic bacteria

2. Course Code :

3. Semester (2)/ Year 2025-2026

4. Description Preparation Date: 15/2/2026

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total) / 30 Hours

4. Course administrator's name (mention all, if more than one name)

**8. Course Objectives : explain relationship between human and bacteria
explain some of Some Medically Important Bacteria**

9. Teaching and Learning Strategies

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen.	<ul style="list-style-type: none"> • Pathogenesis of bacterial infection <ul style="list-style-type: none"> ✓ Identifying bacteria that cause disease. ✓ Bacterial virulence factors. 		2	1
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram positive cocci <ul style="list-style-type: none"> • Genus Staphylococci • Genus Streptococci 			2
Homework Daily Exams	Live lecture, mutual	Gram positive spore forming			3



Monthly Exams Discussion Groups	scientific discussion smart screen	rods <ul style="list-style-type: none"> • Genus Bacillus • Genus Clostridium 			
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram positive Non-spore forming rods <ul style="list-style-type: none"> • Genus Corynebacteria • Genus Listeria 			4
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative diplococci <ul style="list-style-type: none"> • Genus Neisseria 			5
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative coccobacilli <ul style="list-style-type: none"> • Genus Brucella • Genus Pasteurella 			6
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Escherichia • Genus Klebsiella 			7
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Enterobacter • Genus Citrobacter 			8
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Salmonella • Genus Shigella 			9
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Proteus • Genus Yersinia 			10
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Pseudomonas • Genus Vibrio 			11
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Gram negative rods <ul style="list-style-type: none"> • Genus Campylobacter • Genus Helicobacter 			12
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	<ul style="list-style-type: none"> • Genus Mycobacteria 			13



Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Spirochetes <ul style="list-style-type: none"> • Genus Treponema • Genus Leptospira 			14
Homework Daily Exams Monthly Exams Discussion Groups	Live lecture, mutual scientific discussion smart screen	Genus Rickettsia			15

11. Course Evaluation

Final exam / 70
Mid-semester exam / 25
Quizzes / 5

12. Learning and Teaching Resources

Required textbooks	<ul style="list-style-type: none"> • Review of medical microbiology . Jawetz. • Lange Medical Microbiology, 24th Edition: Jawetz, Melnick, & Adelberg; McGraw–Hill Medical 2007. • Jawetz, Melnick, & Adelberg’s Medical Microbiology twenty–fourth edition Geo. F. Brooks, et al. • Medical Microbiology and Infection at a Glance Stephen H. et al.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	



Head of Dep.
Prof. Dr. Bassim.A.Jassim

Lecturer
Prof. Maitham A. Makei

Course Description Form

1. Course Name: **Adv. Plant physiology**

2. Course Code:

3. Semester / Year: **First Semester**

4. Description Preparation Date: **1-9-2025**

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total):

4/3

7. Course administrator's name (mention all, if more than one name)

Name: **Prof. Dr. Faiq H. Ali**

Email: **faiq_Alradi73@mu.edu.iq**

8. Course Objectives

- | | |
|----------------------|--|
| Course Object | <ul style="list-style-type: none"> • Explain the basic principles of able plant who absorbed water • Explaining the using the sun energy to build his food • As well as clarifying the methods of repiration in plants • As well as knowing the chemical product • As well as knowing the mineral nutrients |
|----------------------|--|

9. Teaching and Learning Strategies

- | | |
|--------------|---|
| Strat | <ul style="list-style-type: none"> • Active Participation and Interaction: Engage students in discussions and interactive lectures to deepen understanding. • Hands-on Laboratory Sessions: Facilitate practical experiments to apply theoretical knowledge. • Case Studies and Practical Workshops: Provide real-world scenarios to enhance problem-solving skills. • Communication Skills Training: Develop written and oral communication skills for scientific contexts. • Integration of General and Transferable Skills: Incorporate critical thinking, problem-solving, and research skills into the curriculum. • Ethical Considerations: Discuss ethical issues related to genetic research and engineering. • Staying Updated with Research: Encourage students to read scientific journals and participate in research activities. • Collaboration and Teamwork: Promote group projects and teamwork to simulate scientific collaboration. |
|--------------|---|

10. Course Structure

We ek	Hou rs	Required Learning Outcomes	Unit or subject name	Learning method	Evaluati on method
1	2	<ul style="list-style-type: none"> • Solute Potential • PressurePotential • Gravitational Potential • 	Plant Water Relations	Lecture and Discussion	Quiz

2	2	<ul style="list-style-type: none"> • Diffusion • Mass Flow • Osmosis 	Intercellular Water Transport USED	Quiz	Report
3	2	<ul style="list-style-type: none"> • apoplast, symplast, and transcellular pathways • Water Absorption by Roots • Movement of Water Across Endodermis 	Short-Distance Transport	Practical Workshop	Report
4	2	<ul style="list-style-type: none"> • Water Transport Through Xylem • Mechanism of Transport Across Xylem 	Long-Distance Transport	Lecture and Discussion	Mid-term Exam
5	2	<ul style="list-style-type: none"> • Macronutrients. • Micronutrients • Plant Nutrition 	Plant Mineral Nutrition	Laboratory Session	Report
6	2	<ul style="list-style-type: none"> • Water and Ion Uptake from Soil into Roots • Symplastic Transport Across Plasmodesmata • Diffusion vs Bulk Transport of Water and Solutes 	Water and Solute Transport	Lecture and Discussion	Quiz
7	2	<p>Light Reaction</p> <ul style="list-style-type: none"> • Split of water molecule • Reduction of ATP and NADPH 	Photoassimilate Translocation	Practical Workshop	Assignment
8	2	<ul style="list-style-type: none"> • Basic Energetic Principles that Govern Metabolism • Energy Coupled Reactions • Structure of ATP 	Concepts in Metabolism	Laboratory Session	Report
9	2	<ul style="list-style-type: none"> • Properties of Light • Mechanism of Light Absorption 	Photosynthesis	Lecture and Discussion	Quiz

		<ul style="list-style-type: none"> and Emission • Photosynthetic Pigments • Action Spectrum Relates to Absorption Spectra 			
10	2	<ul style="list-style-type: none"> • Glycolysis • Preparatory Steps • Entry of Molecules in Glycolysis Other than Glucose 	Respiration	Lecture	Assignment
11	2	<ul style="list-style-type: none"> • oxidative photosynthetic carbon cycle. • photosynthetic carbon oxidation cycle 	Photorespiration	Lecture	Mid-term Exam
12	2	<ul style="list-style-type: none"> • Oxidative Phase • Non-oxidative Phase • Significance of OPPP 	Oxidative Pentose Phosphate Pathway (OPPP)	Lecture and Discussion	Quiz
13	2	<ul style="list-style-type: none"> • Pyruvate Metabolism • Fermentation • Pyruvate Metabolism in Mitochondria 	PEP Metabolism in Cytosol	Lecture and discussion	Report

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	<ul style="list-style-type: none"> • Plant Physiology, Development and Metabolism
Recommended books and references (scientific journals, reports...)	Scientific journals of plant physiology
Electronic References, Websites	<ul style="list-style-type: none"> • Plant web • Botany science website

Course Description Form

1. Course Name: Advanced Molecular biology
2. Course Code:
3. Semester / Year 2025-2026 1 st semester
4. Description Preparation Date:
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
Assistant professor Dr. Yasir Adil Jabbar
8. Course Objectives The course focus on the studying of gene mechanisms on advance molecular levels
9. Teaching and Learning Strategies

4. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Required Learning Outcomes	Discovery of genetic material	Lecture and Discussion	Quiz
2	2	Genes, genomes, and plasmids in bacteria	DNA, RNA and Protein	Laboratory Session	Lab Report
3	2	Structural properties of plasmids	Genes, Genomes and DNA	Practical Workshop	Lab Report
4	2	Plasmid DNA extraction and purification methods	Cell Division and DNA Replication	Lecture and Discussion	Mid-term Exam
5	2	Plasmid replication and copy number control	Transcription of Genes	Laboratory Session	Lab Report
6	2	Transcription and expression of plasmid genes	Protein Synthesis	Lecture and Discussion	Quiz
7	2	Regulation of plasmid transcription	Regulation of Transcription in Prokaryotes	Practical Workshop	Assignment
8	2	Mobile DNA and plasmid transfer	Bacterial Genetics	Laboratory Session	Lab Report
9	2	Manipulation of	Mutations	Lecture and	Quiz

		plasmid DNA		Discussion	
10	2	Gene cloning using plasmid vectors	Mobile DNA	Lecture and Case Study	Assignment
11	2	PCR in plasmid construction and verification	Nucleic Acids: Isolation, Purification, Detection, and Hybridization	Practical Workshop	Mid-term Exam
12	2	Recombinant protein expression systems	Recombinant DNA Technology	Lecture and Discussion	Quiz
13	2	Plasmids in bacterial genetics and mutations	The Polymerase Chain Reaction	Laboratory Session	Lab Report
14	2	Plasmids in genomics and sequencing	Genomics and DNA Sequencing	Lecture and Discussion	Assignment
15	2	Advanced plasmid technologies	Protein Structure and Function	Lecture and Case Study	Final Exam

5. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

6. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Molecular Genetics of Bacteria" by Larry Snyder and Wendy Champness
Main references (sources)	Molecular Genetics of Bacteria (2004) 4 & 5th Edition, University of Surrey, UK. John Wiley & Sons Ltd,
Recommended books and references (scientific journals, reports...)	Brooker, Robert J. Genetics : analysis & principles / Robert J. Brooker. — 4th ed. Molecular Biology 1 and 2nd Edition by David P. Clark Fundamental Molecular Biology by Allison, Lizabeth.
Electronic References, Websites	<ul style="list-style-type: none"> • National Center for Biotechnology Information (NCBI) • PubMed • Microbiology Society website

Course Description Form

1. Course Name: biotechnology					
2. Course Code: Bio					
3. Semester / Year: master					
4. Description Preparation Date: 11-2-2026					
5. Available Attendance Forms:					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4/3					
7. Course administrator's name (mention all, if more than one name)					
Name: Prof. Dr. Nuha Mohammed Mousa					
Email: nuhamoh@mu.edu.iq					
8. Course Objectives					
Course Objectives	<p>1. To provide students with a clear description of the expectations, schedules and evaluation procedures for the course in biotechnology .</p> <p>2. It is the beginning of a data of information in biotechnology that students can take with themselves into their chosen discipline.</p> <p>3. It is a communication device that the students can use as they talk with their teachers throughout their training period</p>				
9. Teaching and Learning Strategies					
Strategy	<p>1.(Inquiry-Based Learning)</p> <p>2. (Modeling & Simulation)</p> <p>3. (Problem-Based Learning - PBL)</p> <p>5. Analogy Strategy)</p> <p>6. (Role-Playing)</p>				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	definition of biotechnology , general properties and structure of parasites	biotechnology , definition of biotechnology , general properties	Lecture and Discussion	Quiz
2	2	Biomass : a	World productivity of	Lecture and Discussion	Report

		biotechnology substrate?	biomass ,World production of agricultural and forestry products		
3	2	Fungal growth and fermentation tools .Classical strain improvement and tools Natural selection and mutation	General Characteristics,Classical strain improvement and tools	Practical Workshop	Report
4	2	Applied microbial genetics	The bioreactor	Lecture and Discussion	Mid-term Exam
5	2	Scale-up	biotechnological processes will have been identified at a laboratory scale, and ultimately commercial success will be dependent on the ability to scale-up the process, first from laboratory to pilot plant level and then to full commercial scale.	Laboratory Session	Report
6	2	Media design for fermentation processes		Lecture and Discussion	Quiz
7	2	Plant cell culture	Downstream processing	Practical Workshop	Assignment
8	2	Mid Term Examination	Mid Term Examination	Laboratory Session	Report
9	2	Enzyme technology 1.The nature of enzymes The application of .2 enzymes	Selection and development of producer strains for enzyme production The technology of enzyme production, Immobilised enzymes	Lecture and Discussion	Quiz
10	2	gene therapy	introduction , vectors for gene therapy	Lecture and Case Study	Assignment
11	2	PCR applications,types			Mid-term Exam
12	2	Gel Electrophoresis applications, Types	Types of Gels	Lecture and	Quiz

				Discussion	
13	2	Nanotechnology		Lecture and Discussion	Report

11. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

12. Learning and Teaching Resources

Required textbooks (curricular books any)	Green, M. R., & Sambrook, J. (2012). <i>Molecular Cloning: A Laboratory manual</i> . Cold Spring Harbor Laboratory Press.
Main references (sources)	national Center for Biotechnology Information (NCBI). (2024). <i>PubMed Database</i> . National Institutes of Health. Retrieved from https://pubmed.ncbi.nlm.nih.gov
Recommended books and references (scientific journals, reports...)	Scientific journals on biotechnology
Electronic References, Websites	<ul style="list-style-type: none"> • PubMed • NCBI (National Center for Biotechnology Information)



Course Description Form

1. Course Name: Advanced Biochemistry
2. Course Code :
3. Semester / Year 2025-2026 1st semester

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

Course administrator's name (mention all, if more than one name) assistant professor
Muna Hasson Saoudi

8. Course Objectives Build upon foundational knowledge to provide a deeper understanding of cellular and molecular processes, including metabolism, gene expression, and protein structure and function.

9. Teaching and Learning Strategies

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
		Fundamentals of Biochemistry			1
		Bioenergetics			2
		Metabolism pathways			3
		Intermediary Metabolism			4
		Regulation of Gene Expression and Genetic Engineering			5
		Biochemistry of Molecular Biology			6
		Endocrinology			7
		Cancer biology			8
		Plant Biochemistry & Biotechnology			9
		Human Physiology & Immunology			10
		Bioinformatics			11
		Nano science and Technology in Biochemistry			12
		Fundamentals of Enzymology			13
		Human Nutrition Biochemistry			14
		Clinical biochemistry			15



11. Course Evaluation

Final exam / 70
Mid-semester exam / 25
Quizzes / 5

12. Learning and Teaching Resources

Required textbooks	
Main references (sources)	Lehninger Principles of Biochemistry , Voet's Biochemistry , Lippincott Illustrated Reviews
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Head of Dep.

Lecturer

Assistant professor : **Muna Hasson**

Course Description Form

1. Course Name: Research Methodology					
2. Course Code:					
3. Semester / Year: Second Semester					
4. Description Preparation Date: 16-2-2026					
5. Available Attendance Forms:					
6. Number of Credit Hours (Total) / Number of Units (Total):					
7. Course administrator's name (mention all, if more than one name)					
Name: Prof. Dr. Ibtehal Aqeel Abdulmuneem					
Email: ibtihalaqq@mu.edu.iq					
8. Course Objectives					
Course Objective	<ul style="list-style-type: none"> This course covers the qualities of an outstanding researcher, how to write a research paper according to the basic rules of publication, how to choose a journal, and the publication process.. 				
9. Teaching and Learning Strategies					
Strategies	<ul style="list-style-type: none"> Active Participation and Interaction: Engage students in discussions and interactive lectures to deepen understanding. Hands-on Laboratory Sessions: Facilitate practical experiments to apply theoretical knowledge. Case Studies and Practical Workshops: Provide real-world scenarios to enhance problem-solving skills. Communication Skills Training: Develop written and oral communication skills for scientific contexts. Integration of General and Transferable Skills: Incorporate critical thinking, problem-solving, and research skills into the curriculum. Ethical Considerations: Discuss ethical issues related to genetic research and engineering. Staying Updated with Research: Encourage students to read scientific journals and participate in research activities. Collaboration and Teamwork: Promote group projects and teamwork to simulate scientific collaboration. 				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Good scientific author	Clear writing, attention to detail, organize and structure annotation and origin	Lecture and Discussion	Quiz
2	2	Writing good paper	Understand the purpose, plan and organize, writing style and tone	report	Report
3	2	Testing the quality of journal	Impact factor, peer review process, journal publisher	Practical Workshop	Report
4	2	Set up guide to register on	Visit the researchgate	Lecture and	Mid-term

		reaserchgate	website, sign up for new count, choose your sign up method	Discussion	Exam
5	2	Submitting paper to scientific journal	steps	report	Report
6	2	Writing of referencess	Style for writing	Lecture and Discussion	Quiz
7	2	H-index	Definition, significancy	test	report
8	2	test			
9	2	Writing of MSC& PHD thesis		report	report
10	2	Qualitative search	General characters of qualitative search	report	report
11	2	Character of good hypothesis		report	Quize
12	2	Literature review		report	Quize

11. Course Evaluation

Final exam / 70
Mid-semester exam / 25
Quizzes / 5

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1- Hilary glasman-Deal, 2010
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	



Course Description Form

1. Course Name: Adv. Mycology

3. Course Code :

5. Semester / Year 2025-2026

4. Description Preparation Date: 16\2\2026

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

2h

7. Course administrator's name (mention all, if more than one name)

M Mouna Akeel Hamed Al-Oebady

8. Course Objectives

Fungal Fundamentals: Define and describe the basic taxonomy, nomenclature, and general characteristics of medically important fungi, including their unique cell structure and physiology.

Morphological Identification: Differentiate between various morphologic forms, such as

9. Teaching and Learning Strategies

: Students analyze real-life clinical cases to identify learning objectives, helping them apply fungal biology to patient care and management.

I Theoretical concepts—such as fungal taxonomy, physiology, and pathogenesis—are delivered through interactive, expository lectures that encourage dialogue.

Use of comprehensive systems that include clear biological explanations, diagnostic methodologies, and interactive quizzes to allow for flexible, personalized learning.

Enquiry-Based Learning (EBL): Students start by posing questions or problems and conduct research to find solutions, which they then discuss in groups to consolidate knowledge.

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
	Interactive Lectures & Morphology Slide Shows	Introduction to Medical Mycology and Fungal Pathogenesis	Differentiate between fungal and bacterial structures and	2	1



				classify major fungal phyla based on morphology.		
			Fungal Structure, Growth, and Morphology	2. Implement aseptic techniques and BSL-2 safety protocols for handling clinical fungal cultures.		2
			Superficial Mycoses (Pityriasis versicolor and Tinea nigra)	3. Execute KOH preparation and identify dermatophytes from skin, hair, and nail specimens.		3
			Cutaneous Mycoses (Dermatophytosis and Ringworm)	4. Distinguish between pathogenic yeasts using germ tube assays and biochemical profiling.		4
			Subcutaneous Mycoses (Sporotrichosis and Mycetoma)	5. Recognize the phase transition in dimorphic fungi and its clinical significance in systemic mycoses.		5
			Endemic Systemic Mycoses (Histoplasmosis and Blastomycosis)	6. Relate host immune deficiencies to the pathogenesis of opportunistic fungi like Aspergillus and Mucor.		6
			Opportunistic Mycoses (Candidiasis and Aspergillosis)	7. Explain fungal virulence factors and the host's innate and adaptive immune responses.		7
			Cryptococcosis and Zygomycosis (Mucormycosis)	8. Identify histopathological features of fungi in tissue sections using specialized stains (PAS, GMS).		8
			Pneumocystis Pneumonia (PJP)	9. Perform and interpret macroconidia and microconidia identification for filamentous fungi.		9
			Mycotoxins and Fungal Poisoning	10. Interpret		10



			(Mycetismus)	molecular diagnostic data (PCR and MALDI-TOF) for rapid species identification.	
			Laboratory Diagnosis of Fungal Infections	11. Compare the mechanisms of action and pharmacokinetics of major antifungal drug classes.	11
			Antifungal Agents and Mechanisms of Action	12. Perform antifungal susceptibility testing (AST) following CLSI or EUCAST standards.	12
			Antifungal Resistance and Susceptibility Testing	13. Analyze the epidemiology and infection control measures for emerging threats like <i>Candida auris</i> .	13
			Immunology of Fungal Infections	14. Evaluate clinical case studies to correlate laboratory findings with patient management plans.	14
			Introduction to Medical Mycology and Fungal Pathogenesis	15. Synthesize a comprehensive diagnostic report integrating microscopy, culture, and molecular results	15

11. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

12. Learning and Teaching Resources

Required textbooks



Main references (sources)	Larone's Medically Important Fungi:
Recommended books and references (scientific journals, reports...)	Clinical Mycology (E-Book)
Electronic References, Websites	

Head of Dep.

Lecturer

Course Description Form

1. Course Name: **Adv. Cell Biology**

2. Course Code:

3. Semester / Year: first Semester

4. Description Preparation Date: 21-2-2026

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total):

4/3

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Mohammed Qasim Waheeb

Email: mhmdkas@mu.edu.iq

8. Course Objectives

Course
Objectiv

- This course aims to develop an understanding of zoology by exploring their characteristics, defining them, and classifying them.
- It also aims to prepare and qualify students to prepare glass slides.
- Furthermore, it aims to develop and encourage scientific research.
- The course also aims to provide all students with a comprehensive education in the fundamental aspects during the first year and to equip them with a higher level of knowledge and understanding of their chosen subject in the second year.

9. Teaching and Learning Strategies

Strate

- The student actively participates during the lecture.
-
- 2. The student listens attentively to the explanation.
-
- 3. The student actively participates in extracurricular activities.
-
- 4. The student learns professional conduct.
-
- 5. General and transferable skills (other skills relevant to employment and personal development).
-
- 6. The student is equipped to succeed in job interviews and the job market.
-
- 7. The student is empowered to pursue professional development after graduation..

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A. Cell Biology	Introduction to Cells, Evolution of Life on Earth.	Lecture and	Report

				Discussion	
2	2		Chemical and Physical Background, Molecules: Structures and Dynamics, Biophysical Principles	Lecture and Discussion	Report
3	2		Membrane Structure and Function	Lecture and Discussion	Report
4	2		Membrane Structure and Dynamics	Lecture and Discussion	Mid-term Exam
5	2		Cellular Organelles and Membrane Trafficking	Lecture and Discussion	Lecture and Discussion
6	2		Posttranslational Targeting of Proteins	Lecture and Discussion	Report
7	2		Secretory Membrane System and Golgi Apparatus	Lecture and Discussion	Report
8	2		Endocytosis and the Endosomal Membrane System	Lecture and Discussion	Mid-term Exam
9	2		Signaling Mechanisms	Lecture and Discussion	Quiz
10	2		Plasma Membrane Receptors	Lecture and Discussion	Report
11	2		Cellular Adhesion and the Extracellular Matrix	Lecture and Discussion	Report
12	2		Extracellular Matrix Molecules	Lecture and Discussion	Report
13	2		Cellular Adhesion	Lecture and Discussion	Report

11. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

12. Learning and Teaching Resources

Required textbooks (curricular books if any)

A. Cell Biology

Main references (sources)

A. Cell Biology, THOMAS D. POLLARD, MD

Recommended books and references (scientific journals, reports...)

Electronic References, Websites	
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Course Description Form

1. Course Name: **Adv. Animal Physiology**

2. Course Code :

3. Semester / Year : **Second/ postgraduate - master**

4. Description Preparation Date: **2026/2/16**

4. Available Attendance Forms: **Attendance inside the classroom**

6. Number of Credit Hours (Total) / Number of Units (Total) : **2hours – 2 unit**

5. Course administrator's name (mention all, if more than one name):
Assist prof. Dr. Hanaa Ali Aziz

8. Course Objectives

1. To enhance students' understanding of modern theoretical and practical concepts and technologies.
2. To equip students with the necessary practical and technical skills to work in their field of specialization.
3. To enable graduates to improve their work in their field of specialization, such as in hospitals and medical centers, both public and private.

9. Teaching and Learning Strategies

1. Assess student performance directly through tests, assignments, and discussions.
2. Utilize educational videos and programs.
3. Encourage students to think critically and solve problems.
4. Foster student collaboration and teamwork by opening avenues for discussion and dialogue.

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Introduction of physiology	Understanding and Analysis	2 hour	First
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Integumentary System	Understanding and Analysis	2 hour	Second



Exams, Quizzes Discussions	Theoretical lecture Videos and images	Respiratory system	Understanding and Analysis	2 hour	Third
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Cardiovascular system	Understanding and Analysis	2 hour	Fourth
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Blood cells	Understanding and Analysis	2 hour	Fifth
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Urinary system	Understanding and Analysis	2 hour	Sixth
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Nervous system .	Understanding and Analysis	2 hour	Seventh
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Male Reproductive system.	Understanding and Analysis	2 hour	Eighth
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Female Reproductive system.	Understanding and Analysis	2 hour	Ninth
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Digestive system	Understanding and Analysis	2 hour	Ten
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Muscular system	Understanding and Analysis	2 hour	Eleven
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Nervous system .	Understanding and Analysis	2 hour	Twelve
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Endocrinology 1	Understanding and Analysis	2 hour	Thirteen
Exams, Quizzes Discussions	Theoretical lecture Videos and images	Endocrinology 2	Understanding and Analysis	2 hour	Fourteen
		Exam		2 hour	Fifteen

11. Course Evaluation

Final exam / 70
Mid-semester exam / 25
Quizzes / 5

12. Learning and Teaching Resources

Required textbooks	
Main references (sources)	Medical physiology Gunstream's Anatomy & Physiology
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Head of Dep.

Lecturer

Assist prof .Dr. Hanaa Ali Aziz



Course Description Form

1. Course Name: Advanced ecology

2. Course Code :

3. Semester / Year Second- 2025-2026

4. Description Preparation Date: 15-2-2026

5. Available Attendance Forms: Hall

6. Number of Credit Hours (Total) / Number of Units (Total)

30/2

4. Course administrator's name (mention all, if more than one name)

Ali Abdulhamza Al-Fanharawi/ alialfanharawi@mu.edu.iq

8. Course Objectives

- 1- Student will gain understanding of key theory and concept in modern ecology, including definition, historical development
- 2- This course aim at reducing the environmental load in industries that are supplies materials and resources taken from environment
- 3- Student acquire an advanced knowledge to pioneer new environmental friendly processes.

Natural History and Geography of Biomes.

9. Teaching and Learning Strategies

- 1- Knowledgethe Environmental Problems, Their Causes, and Sustainability
- 2- The flux of Energy in an Ecosystem
- 3- The flux of Matter in an Ecosystem.
- 4- Biodiversity and Its Important.etc

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Exams-Seminars	Lecture-Discussion-Assignments	Environmental Science and Sustainability Environmental Problems, Their Causes, and Sustainability	Understanding-Application	2	1
Exams-Seminars	Lecture-Discussion-Assignments	Resources and its Classification	Understanding-Application	2	2
Exams-Seminars	Lecture-Discussion-Assignments	Pollution and Principles of Sustainability, Organization levels in ecology	Understanding-Application	2	3



Exams-Seminars	Lecture-Discussion-Assignments	The flux of Energy in an Ecosystem	Understanding-Application	2	4
Exams-Seminars	Lecture-Discussion-Assignments	The flux of Matter in an Ecosystem	Understanding-Application	2	5
Exams-Seminars	Lecture-Discussion-Assignments	Biodiversity and Its Important.	Understanding-Application	2	6
Exams-Seminars	Lecture-Discussion-Assignments	Speciation, Extinction, and Human Activities Affect Biodiversity	Understanding-Application	2	7
Exams-Seminars	Lecture-Discussion-Assignments	Discussions1	Understanding-Application	2	8
Exams-Seminars	Lecture-Discussion-Assignments	Species Interaction	Understanding-Application	2	9
Exams-Seminars	Lecture-Discussion-Assignments	Response of Communities to Changing Environmental Condition.	Understanding-Application	2	10
Exams-Seminars	Lecture-Discussion-Assignments	Human Population and Its Impact	Understanding-Application	2	11
Exams-Seminars	Lecture-Discussion-Assignments	Terrestrial Biodiversity	Understanding-Application	2	12
Exams-Seminars	Lecture-Discussion-Assignments	Aquatic Biodiversity	Understanding-Application	2	13
Exams-Seminars	Lecture-Discussion-Assignments	Latest environmental challenges	Understanding-Application	2	14
Exams-Seminars	Lecture-Discussion-Assignments	Discussions2	Understanding-Application	2	15

11. Course Evaluation

Final exam / 70
 Mid-semester exam / 25
 Quizzes / 5

12. Learning and Teaching Resources

Required textbooks

Main references (sources)

Essentials of Ecology, Miller & Spoolman, 2009



Recommended books and references (scientific journals, reports...)

Electronic References, Websites

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Head of Dep.

Lecturer
Prof. Dr. Ali Abdulhamza Al-Fanharawi



Course Description Form

1. Course Name: Advanced Biostatistics

2. Course Code :

3. Semester / Year: First Semester, Academic Year 2025–2026

4. Description Preparation Date: 1/9/2025

5. Available Attendance Forms: In-person

6. Number of Credit Hours (Total) / Number of Units (Total) : Total Hours = 2 | Total Units = 2

4. Course administrator's name (mention all, if more than one name)

Prof. Dr. Safaa K. Kadhem
Email: Safaakadhem@mu.edu.iq

8. Course Objectives

- Enable students to understand and apply advanced principles of biostatistics in life sciences.
- Develop students' ability to analyze biological and medical data using advanced statistical methods.
- Enhance critical thinking skills in interpreting biological and statistical results.

9. Teaching and Learning Strategies

- Providing periodic quizzes and practical exercises to evaluate students' understanding and application of concepts.
- Providing immediate feedback on practical and theoretical performance to enhance continuous learning.
- Encouraging students to search for recent scientific articles and apply statistical methods to them.
- Developing critical thinking skills and self-analysis of data before presenting results.



10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
Short questions + discussion	Interactive lecture + discussion	Introduction & Probability Distributions	Understanding fundamentals and probability review	2	1
Applied exercises	Lecture + exercises	Descriptive Statistics & Estimation	Interpret descriptive data and samples	2	2
Design simple experiment	Lecture + discussion	Randomization, Replication, Blocking	Understand experimental design basics	2	3
Data analysis + report	Interactive lecture + discussion	Factorial, CRD, RCBD	Apply factorial designs	2	4
Exercises + report	Lecture + exercises	Factorial Analysis	Interpret multi-factor experiments	2	5
Quiz + analysis	Lecture + discussion	GLM for experiments	Use linear models	2	6
Analysis + report	Interactive lecture + discussion	Repeated / Split-Plot	Handle repeated measures	2	7
Applied report	Lecture + exercises	Mixed-Effects Models	Analyze complex experiments	2	8
Short report	Lecture + discussion	Bootstrap & Permutation	Use nonparametric methods	2	9
Results report	Interactive lecture + discussion	Interaction & Post-Hoc Tests	Evaluate interactions	2	10
Analysis + report	Lecture + exercises	Missing / Non-normal Data	Handle imperfect data	2	11
Presentation	Lecture + discussion	Experimental Project	Apply full project	2	12
Final report	Interactive lecture + discussion	Scientific Report Writing	Develop scientific communication	2	13
Final exam	Lecture + exercises	General Review	Comprehensive review	2	14

11. Course Evaluation

- Quizzes – 5%
- Mid-examination – 20%
- Attendance – 5%
- Final Examination – 70%
- Total – 100%



12. Learning and Teaching Resources

Required textbooks	<ol style="list-style-type: none">1. Design and Analysis of Experiments – Douglas C. Montgomery2. Biostatistics: A Foundation for Analysis in the Health Sciences – Wayne W. Daniel
Main references (sources)	<ol style="list-style-type: none">1. Statistical Procedures for Agricultural Research – Gómez & Gómez
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	<ol style="list-style-type: none">1. PubMed – Scientific articles in biological sciences and data analysis